

**DETAILED ACTION**

1. This is the second action in the application in response to the correspondence filed on 29 July 2008.
2. Claims 1 - 15 are pending in the application. Claims 1 – 14 have been amended. Claim 15 is a newly added claim from the 23 August 2006 correspondence.
3. The corrected abstract has been considered and objection to the abstract has been withdrawn given the applicant's corrections.
4. The corrected drawings have been considered and objection to the drawings have been withdrawn given the applicant's corrections.
5. Applicant's arguments with respect to amended claims 1 – 14 and newly added claim 15 from the 29 July 2008 correspondence have been considered and are addressed in the statement of rejection below, necessitated by amendment. Response to arguments follows the statement of rejection. This action is made Final.

***Specification***

6. The disclosure is objected to because of the following informalities: Page 5 Lines 1-3, unit number 130 is described once as an inverter then as a converter.  
Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 15 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim is not clear as to whether it is an independent or dependent claim. Examiner for prosecution reads this claim to be dependent on claim 1.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 9, 10, 11, 12, and 15 are rejected under 35 U.S.C. 102(b), as being anticipated by Crouse et al. (U.S. 5,434,477), herein referred to as Crouse.

9. As for claim 1, Crouse teaches a **half-bridge inverter, comprising a first branch of two switches coupled in series between a first reference node and a second reference node; a second branch of two buffer capacitors coupled in series between said first reference node and said second reference node; an output branch connected between a first node between said two switches and a second node between said two buffer capacitors (Crouse, Fig. 5); an AC mains source connected across the output branch for providing AC power having a mains frequency which is less than a switching frequency of the two switches (Crouse, Col. 1, Lines 56–57; Col. 2, Lines 38 - 39; Fig. 5); and a boost converter having an output connected directly to said first node between said two**

**switches**(Crouse, Fig. 5). AC mains is connected across the output branch via a rectifier.

Examiner suggests inserting the definitive language such as an AC mains source connected "directly" across the output branch and pulling in the limitations from claim 4 to make this independent claim allowable.

10. As for claim 9, Crouse further teaches **a switch controller adapted to generate control signals for controlling said two switches to either their conductive or their non-conductive state, the switch controller being adapted to drive the two switches [with] pulse width modulation** (Crouse, Fig. 5).
11. As for claim 10, 11, and 12 the clause "adapted to" does not limit the scope of claim 9, as a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. The structure of Crouse, since able to perform all the limitations (simply by the ability to control the switching of the half bridge) on claims 10, 11, and 12, Crouse's invention meets claims 10, 11, and 12.
12. As for claim 15, Crouse further teaches **the mains frequency is substantially 50 - 60 Hz** (Crouse, Col. 1, Lines 56– 57).

#### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crouse, as applied to claim 1 above, in view of Bogdan (6,040,661), herein referred to as Bogdan.

14. As for claim 2, Crouse teaches all the above limitations in claim 1, but does not teach **the output branch comprises a series arrangement of gas discharge lamp, a decoupling capacitor and an inductor**. Bogdan teaches **the output branch comprises a series arrangement of gas discharge lamp, a decoupling capacitor and an inductor** (Bogdan, Col. 5, Lines 1 – 19; Fig. 8). It would have been obvious for a person of ordinary skill in the art at the time of the invention to combine Bogdan with Crouse to limit the current flow and block DC voltage spikes within the lamp and thereby minimize switching losses.

15. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crouse, as applied to claim 1 above, in view of Nilssen (4,608,523), herein referred to as Nilssen.

16. As for claim 3, Crouse teaches all the above limitations in claim 1, but does not teach **an inductor connected in series with the AC mains source across the output branch**. Nilssen teaches **an inductor connected in series with the AC mains source across the output branch** (Nilssen, Fig. 1 and 2). The prior art references teach all of the claimed

elements. One of ordinary skill in the art would have recognized that Nilssen's invention relates to building an instant start voltage and power factor unity for efficient operation of the lamp pre and post ignition (Nilssen, Col. 3, Lines 7 – 10; Col. 1, Lines 61 - 64). It would have been obvious for a person of ordinary skill in the art at the time of the invention to combine Bogdan with Crouse to further the efficient operation of the lamp.

17. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crouse, as applied to claim 1 above, in view of Powers (4,972,124), herein referred to as Powers.
18. As for claim 8, Crouse teaches all of the limitations, as applied to claim 1 above, but does not teach **the output branch comprises a transformer driving a rectifier**. Powers teaches **the output branch comprises a transformer driving a rectifier** (Powers, Fig. 1, Elements 29 and 34; Col. 4, Line 67 – Col. 5, Line 9). The prior art references teach all of the claimed elements. One of ordinary skill in the art would have recognized that Nilssen's invention relates applying a DC bias to the lamp, requiring a much lower potential to start conduction in the lamp (Powers, Col. 5, Line 9 – Col. 5, Line 13). It would have been obvious for a person of ordinary skill in the art at the time of the invention to combine Powers with Crouse to further the efficient operation of the lamp.
19. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crouse, as applied to claim 1 above, in view of Muljadi et al. (5,747,967), herein referred to as Muljadi.
20. As for claim 13, Crouse teaches all of the limitations, as applied to claim 1 above, but does not teach **the boost converter comprises at least one photo-voltaic cell, a boost inductor having one terminal coupled to an output of the photo-voltaic cell and having**

**another terminal coupled to a first terminal of a rectifying element, the rectifying element having an output terminal coupled to the output of the boost converter.**

Muljadi teaches **the boost converter comprises at least one photo-voltaic cell, a boost inductor having one terminal coupled to an output of the photo-voltaic cell and having another terminal coupled to a first terminal of a rectifying element, the rectifying element having an output terminal coupled to the output of the boost converter**

(Muljadi, Fig. 5). The prior art references teach all of the claimed elements. One of ordinary skill in the art would have recognized that Muljadi's invention relates to acquiring a power supply source from a solar energy and the need to boost that solar energy to a usable level. It would have been obvious for a person of ordinary skill in the art at the time of the invention to combine Muljadi with Crouse to boost a solar energy level to a usable level to drive a load.

21. As for claim 14, Crouse teaches all of the limitations, as applied to claim 1 above, but does not teach **the boost converter further comprises an additional switch connected between the second reference node and a node between the boost inductor and the rectifying element**. Muljadi teaches **the boost converter further comprises an additional switch connected between the second reference node and a node between the boost inductor and the rectifying element** (Muljadi, Fig. 5). The prior art references teach all of the claimed elements. It would have been obvious for a person of ordinary skill in the art at the time of the invention to combine Muljadi with Crouse for the reasons mentioned above.

*Allowable Subject Matter*

22. Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 5 – 7 are also objected for similar reasoning.

### **Response to Arguments**

23. Examiner withdraws 35 U.S.C. 112 rejections on claims 6 and 7, given Applicant's amendments.

24. Applicant's arguments in relation to the rejections made under 35 U.S.C. § 103 have been fully considered but they are not persuasive.

25. With regards to the Applicants first argument regarding claim 3, Applicant argues that the prior art does not teach the limitation of the mains frequency being less than the switching frequency. In that confidence, Applicant amends the independent claim 1 to add the limitation of "an AC mains source connected across the output branch for providing AC power having a mains frequency which is less than a switching frequency of the two switches." Examiner respectfully disagrees. First, Crouse teaches an AC mains source connected across the output branch via a rectification module. Examiner could have used other multiple prior arts that have an output branch directly connected to an AC mains in order to form a U.S.C. 103 rejection, but decided to reaffirm the U.S.C. 102 based on the language of the claim. Crouse also teaches that the AC mains frequency is 60 Hz. Applicant objects also that the frequency across the lamp is described as the resonant frequency rather than the switching frequency. Examiner asserts that in Crouse the resonant frequency is

indeed the switching frequency, for in order for the resonant tank to resonate the switching frequency must be at 30kHz. Therefore the switching frequency at 30 kHz is greater than the mains frequency of 60 Hz.

26. Examiner recommends definitive language of "directly connected" as discussed above, moving the allowable subject matter of claim 4 into claim 1 for patentability. Also consideration of cancelling claims 2 and 3 as extraneous.
27. The argument to allow the dependent claims is moot given the standing rejection of the independent claim 1.

#### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAE K. KIM whose telephone number is (571)270-5066. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas Owens can be reached on (571) 272-1662. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JKK

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Page 11